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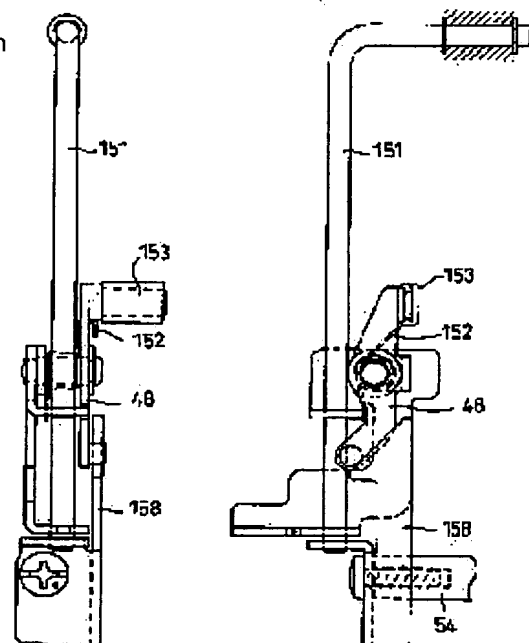
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(54) SEWING MACHINE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a sewing machine which makes it possible to surely pass a thread through the eye of a needle by having a transmitting member for transmitting a force for lowering a hook and by having a holding member for holding the thread.

SOLUTION: A contact member 158 which comes into contact with the transmitting member 48 and moves this member to a cut-off position when a moving mechanism moves the thread holding member to a prescribed position, is fixed to a support block 54. In other words, the support block 54 is fixed to a sewing machine frame and the contact member 158 is so disposed as to be at a fixed position, regardless of the vertical motions of a needlebar and the needle and a swing in the horizontal direction.



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CLAIMS

[Claim(s)]

[Claim 1] The needle which stops in a predetermined vertical location, and the hook which can advance the eye hole of said needle, The energization member which always energizes said hook up, and said energization member **** energization force are resisted. Between the transfer location which transmits the downward force which moves said hook below, and the cutoff locations which intercepted transfer of said downward force A movable transfer member, The having-contact member which moves said transfer member to said cutoff location in contact with said transfer member description if the attachment component holding yarn, the migration device which moves said attachment component to the predetermined location to the eye hole of said needle, and said migration device move said attachment component to said predetermined location, and a sewing machine.

[Claim 2] The sewing machine according to claim 1 characterized by what said needle moves up and down relatively to a sewing-machine frame, and said contact member was supported for by said sewing-machine frame.

[Claim 3] The sewing machine according to claim 1 or 2 characterized by what said needle and said hook rock horizontally to a sewing-machine frame, and said migration device was supported for by said sewing-machine frame.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the sewing machine which lets the held yarn pass by hook to the eye hole of a needle.

[0002]

[Description of the Prior Art] The threader equipment of a sewing machine is conventionally equipped with the hook which can advance the eye hole of a needle, the threader rod which supports that hook to a lower limit, and the threader lever connected with that threader rod, and this threader equipment is arranged above the needle in order to avoid the collision with the needle which moves up and down in the predetermined range. And if this threader rod goes up and down when an operator moves a threader lever up and down, and a threader lever is moved to the bottom location, a hook will become the same height as the eye hole of a needle. Furthermore, in addition to the hook mentioned above, it has the migration device in which threader equipment moves the attachment component holding two places of yarn, and the attachment component holding yarn in front of the eye hole of a needle, and the hook draws the yarn held at the attachment component in the eye hole of a needle.

[0003] Moreover, there is also a sewing machine which was able to establish the device which rocks a needle horizontally, generally the rocking loci of the needle are radii, and the location of the eye hole of a needle changes about a horizontal or the direction of up-and-down with rocking locations of a needle. In order to lessen effect of the location change by the rocking, by the sewing machine by which a needle is rocked, it is arranged so that a threader rod and an attachment component may rock horizontally relatively to a sewing-machine frame with a needle bar. For example, it is threader equipment of a sewing machine given in JP,7-71596,B by these people.

[0004]

[Problem(s) to be Solved by the Invention] However, before the threader lever was moved to the bottom location, the operator has mistaken, it stopped taking down a threader lever, and a possibility that a threader might not be made was. Therefore, these people had the transfer member which transmits the force which depresses a threader rod, after the hook moved forward completely, they intercepted transfer of the force automatically, pulled up the threader rod with the elastic body, and devised the threader equipment which retreats a hook at the time of the raising. It is threader equipment of an application for patent [No. 172264 / 2001 to] publication, makes the transfer member contact the upper limit of a needle bar, and intercepts transfer of the force which depresses a threader rod.

[0005] With the threader equipment of this application, the locations where transfer of the force which depresses a threader rod is intercepted by the halt location of a needle will differ. Therefore, since the distance of the upper limit of a needle bar and a transfer member changes with the halt locations of a needle bar, If a hook moves forward to the eye hole of a needle, transfer of the force is intercepted and a transfer member and the upper limit of a needle bar are far conversely in a hook retreating before an attachment component will reach in front of the eye hole of a needle, if a transfer member and the upper limit of a needle bar are near When an attachment component reaches in front of the eye hole of a needle, before descent of a hook is inadequate, and a hook does not move forward but a hook fully descends, an attachment component estranges from the eye hole of a needle previously, and a hook cannot catch yarn, but it is thought that there is a trouble that a threader is not made. Moreover, there is a trouble of making it a transfer member and the upper limit of a needle bar always become a fixed distance and of complicating the configuration of a sewing machine.

[0006] This invention is offering the sewing machine which can be made in order to solve the trouble

mentioned above, can be equipped with the attachment component holding the transfer member and yarn which transmit the force of dropping a hook, and can let yarn pass to the eye hole of a needle certainly. [0007]

[Means for Solving the Problem] In order to attain this purpose, a sewing machine according to claim 1 The needle which stops in a predetermined vertical location, and the hook which passes through the eye hole of said needle, The energization member which always energizes said hook up, and said energization member **** energization force are resisted. Between the transfer location which transmits the downward force which moves said hook below, and the cutoff locations which intercepted transfer of said downward force A movable transfer member, If the attachment component holding yarn, the migration device which moves said attachment component to the predetermined location to the eye hole of said needle, and said migration device move said attachment component to said predetermined location, it has the contact member which moves said transfer member to said cutoff location in contact with said transfer member.

[0008] And if said migration device moves said attachment component to the predetermined location to the eye hole of said needle, said transfer member and contact member will contact and said transfer member will move to said cutoff location from said transfer location. In case said hook goes up since said hook goes up by the energization member after said hook passes to the eye hole of said needle and said attachment component is moved to a position, said attachment component has reached the position and said hook and said attachment component serve as predetermined relation.

[0009] A sewing machine according to claim 2 is equipped with the needle which moves up and down relatively to a sewing-machine frame, and the contact member supported by said sewing-machine frame, a needle moves up and down relatively to a sewing-machine frame, a contact member is supported by the sewing-machine frame and the vertical location of a needle is arranged independently.

[0010] A sewing machine according to claim 3 is equipped with the needle and hook which are horizontally rocked to a sewing-machine frame, and the migration device supported by said sewing-machine frame, and the horizontal position of the needle which rocked said migration device is arranged independently at said sewing-machine frame.

[0011]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.

[0012] As shown in drawing 1 and drawing 2 , the sewing machine 10 consists of the bed section 12 which has a horizontal plane, the pedestal section 14 set up from the right end section of the bed section 12, the arm section 16 which extends from the pedestal section 14 to the left, and the head section 18 used as the left end section of the arm section 16. In this head section 18 As opposed to the needle-bar drive 28 for moving a needle bar 26 up and down relatively to the sewing-machine frame 24 which constitutes head section 18 grade, and the sewing-machine frame 24 The threader device 38 for letting Yarn T pass by the threader hook 35 to the balance drive 34 for moving a balance 32 up and down with a predetermined phase to the needle-bar rocking device 30 for rocking a needle bar 26 horizontally relatively and a needle bar 26 and the needle 36 of the lower limit of a needle bar 26 is arranged. This needle 36 collaborates with the iron pot device 40 of bed circles, a needle 36 and a balance 32 move up and down with a predetermined phase mutually, and a seam is formed.

[0013] Like the sewing machine of an application for patent [No. ("application of these above-mentioned people" is called hereafter.) 172264 / 2001 to] publication, this sewing machine 10 is removable to a cassette mount 46 in the yarn cassette 44 which contains a yarn die 42, and is a configuration which depresses the threader rod 47 caudad and weighs Yarn T also in a balance 32 by actuation of equipping with that yarn cassette 44 at coincidence. Furthermore, the transfer member 48 which transmits and intercepts the force which depresses the threader rod 47 is equipped with a sewing machine 10, and fundamentally, it is similar to application of these above-mentioned people with the sewing machine of a publication, and is explained below focusing on a different point.

[0014] After once descending to the eye hole 51 of a needle 36 and making the yarn attachment component 50 holding two places of Yarn T, and its yarn attachment component 50 approach the eye hole 51 of a needle 36 on the right-hand side of a balance 32 as this sewing machine 10 shows to drawing 3 unlike the sewing machine of application of these above-mentioned people, it is made to go up and the migration device 52 in which it is made to estrange from the eye hole 51 of a needle 36 is established. This migration device 52 is being fixed to the sewing-machine frame 24 through the support block 54 and the attachment member 56 which are shown in drawing 4 and drawing 5 .

[0015] On the left-hand side of the cassette mount 46, among the threader devices 38, the threader hook

device 55 about the threader hook 35 is arranged so that it may rock in radii by setting a rocking shaft as the center-of-oscillation shaft 58 with a needle bar 26. On the other hand, since the yarn attachment component 50 is being fixed to the sewing-machine frame 24 so that it may not rock with a needle bar 26, it is not necessary to miss for not making high outputs, such as a pulse motor which rocks a needle bar 26 and the threader rod 47, and making the migration device 52 rock, and to establish **** space in the interior of a sewing machine 10, and the miniaturization of a sewing machine 10 is attained.

[0016] Next, the migration device 52 is explained to this yarn attachment component 50 list.

[0017] As shown in drawing 6 (b), the yarn attachment component 50 has two parallel yarn maintenance arms 62 and 64, those yarn maintenance arms 62 and 64 open spacing, extend from the connection section 66 in parallel, and the pars intermedia of the rocking member 68 is supported rockable by the field on the left-hand side of the yarn maintenance arm 62 of the left in drawing 6 (b). At the spring reliance pin 74 to which the volume spring 72 let the rocking shaft 70 of the rocking member 68 pass, and the upper limit in drawing 6 (b) of the rocking member 68 was fixed The volume spring 72 contacts, the upper limit of the rocking member 68 in drawing 6 (a) is energized in the direction of a counterclockwise rotation considering the rocking shaft 70 as a core, and the lower limit in drawing 6 (b) of the rocking member 68 is located near the tip of the left yarn maintenance arm 62.

[0018] Rather than the rocking shaft 70, if are fixed so that the contact pin 76 may project to the left of drawing 6 (b), and the contact pin 76 winds, the elastic force of a spring 72 is resisted and it is pushed leftward [of drawing 6 (a)] by the rocking member 68 of the lower part in drawing 6 (b), to it, the lower limit of the rocking member 68 will estrange from the tip of the yarn maintenance arm 62 of the left in drawing 6 (b). That is, the yarn attachment component 50 is constituted possible [closing motion] so that Yarn T may be inserted.

[0019] The connection section 66 extends to the method of the right of drawing 6 (b), and the 1st interlocking member 78 of the migration device 52 is being fixed. This 1st interlocking member 78 is projected to the method of the right in drawing 6 (b), and as shown in drawing 6 (c), it is attached in the guide slot 84 where that lobe 80 was formed in the migration support plate 82 of the method of the right in drawing 6 (b) by penetrating possible [sliding]. The width of face of this guide slot 84 is extending to the longitudinal direction of the migration support plate 82 of the method of the right in drawing 6 (b), and that width of face is almost the same as the lobe 80 of the 1st interlocking member 78. By six spacing pins 88, 90, 92, 94, 96, and 98, the migration support plate 82 of the method of the right in drawing 6 (b) and the left migration support plate 86 open fixed spacing, and are attached in parallel.

[0020] A block 100,102 is supported pivotable by two upper spacing pins 88 and 90 in drawing 6 , respectively, and the block 104 is supported by one spacing pin 98 of the lower part in drawing 6 pivotable. The pars intermedia of the 1st string-like part material 106 which is a metallic thin wire is applied to these blocks 100,102,104, and as are shown in drawing 6 (a), and right-and-left reversal of the character of abbreviation "N" was carried out, the 1st string-like part material 106 is turned up in the contact part with a block 100,104. This 1st string-like part material 106 is relatively movable to these blocks 100,102,104 and the migration support plate 82. That is, these blocks 100,104 are supporting the 1st string-like part material 106 movable. If the interlocking member 78 of the above 1st is fixed to the pars intermedia of this 1st string-like part material 106 and this 1st string-like part material 106 moves to it, the 1st interlocking member 78 will also move to one relatively to the migration support plate 82. The both ends of this 1st string-like part material 106 are attached possible [sliding of the periphery of that fixed support pin 110,112], although it cannot estrange at the fixed support pin 110,112 which projects from the immobilization support plate 108.

[0021] In this way, the 1st string-like part material 106 is supported by the fixed support pin 110 of the immobilization supporter material 108 impossible [migration of the one side of the 1st string-like part material 106] about the 1st string-like part material 106 of predetermined die length, when the lower part of drawing 7 moves, in addition the direction side is supported by the block 100 of migration supporter material movable. The 1st support device is constituted by the block 100 of the fixed support pin 110 of the immobilization supporter material 108, and the migration supporter plates 82 and 86. As 1st migration member, a block 104 contacts the 1st string-like part material 106 while being supported by this 1st support device, and moves the 1st string-like part material 106 to it. And while the 1st interlocking member 78 is connected with the 1st string-like part material 106 on the left of drawing 7 (other side) rather than the part which contacted the block 104 as 1st migration member, the yarn attachment component 50 as a threader device is connected. Moreover, when the 1st string-like part material 106 moves above drawing 7 , the upper block 104 of drawing 7 acts as migration supporter material of the 1st string-like part material 106. Moreover, when the 1st string-like part material 106 moves above drawing 7 , the block 104 of the lower

part of drawing 7 acts as migration supporter material of the 1st string-like part material 106.

[0022] Therefore, if two migration supporter plates 82 and 86 move only distance d under drawing 7, in connection with it, only distance d will also move a block 100,104 under drawing 7. With those migration, the interstitial segment of the 1st string-like part material 106 is pushed on the lower part in drawing 7 by the block 104, and the 1st string-like part material 106 is sent only for die-length d to left-hand side (migration improper support side) by rotation of a block 104 from the right-hand side (movable support side) of the block 100. That is, when this block 104 moves under drawing 7, it functions as a fall block. The 1st interlocking member 78 and yarn attachment component 50 which were further fixed to the 1st right-hand side string-like part material 106 move only distance $2xd$ caudad rather than the block 100 on the right of this block 104. Thus, this migration device 52 is constituted so that the movement magnitude it is twice whose movement magnitude of a block 104 of this may be produced. In addition, whether one of the blocks 100,104 serve as a migration member as mentioned above depends in the migration direction of the 1st string-like part material 106.

[0023] Moreover, by 2nd string-like part material 114 with the 1st another string-like part material 106 attaching in this immobilization support plate 108, the edge of one side of Hidari's 2nd string-like part material 114 in ** and its drawing 7 is attached possible [sliding of the periphery of that fixed support pin 116], although it cannot estrange at the fixed support pin 116 which projects from the immobilization support plate 108. Moreover, the edge of the 2nd string-like part material 114 of the right in the drawing 7 is attached possible [sliding of the periphery of the spacing pin 90], although it cannot estrange at the spacing pin 90 which projects from the migration support plates 82 and 86.

[0024] The block 118 is in contact with the pars intermedia of this 2nd string-like part material 114, and the 2nd string-like part material 114 is turned up like the character of abbreviation "V" in the contact part with this block 118. This block 118 attaches this cassette contact object 120 possible [sliding of the guide slot (figure abbreviation) formed in the immobilization support plate 122 of one more sheet shown in drawing 8 by penetrating] by being connected so that it may move to the cassette contact object 120 and one, and is *****. If it is arranged in the rise-and-fall path of the yarn cassette 44 and is depressed to a predetermined location so that it may be depressed on the right-hand side of [a part of] the yarn cassette 44, the cassette contact object 120 is constituted so that it may estrange from the yarn cassette 44.

[0025] Between this immobilization support plate 108,122 of two sheets, it is set up and fixed so that both immobilization support plates 108,122 and four spacing pins 122,124,126,128 may cross at right angles, and the immobilization support plate 108,122 of two sheets opens spacing, and is located in parallel. Between them, the migration support plates 82 and 86 of the two above-mentioned sheets and the 1st string-like part material 106 are located, and the 2nd string-like part material 114 is located in a list.

[0026] Thus, the one side of 2nd another string-like part material 114 of predetermined die length is supported impossible [migration] by the fixed support pin 116 of the immobilization support plate 108, and the other side is supported movable by the spacing pin 90 of the migration support plates 82 and 86. The 2nd support device is constituted by the fixed support pin 116 of these immobilization support plate 108, and the spacing pin 90 of the migration support plates 82 and 86, the block 118 as 2nd migration member contacts the 2nd string-like part material 114 while being supported by this 2nd support device, and the 2nd string-like part material 114 is moved. While the spacing pin 90 of the migration support plates 82 and 86 as 2nd interlocking member is connected with the 2nd string-like part material 114 of the other side rather than the part which contacted the block 118, it is connected also with the block 104 as 1st migration member through the migration support plates 82 and 86.

[0027] Moreover, it has the length spring 132 as an elastic body which pulls back the 2nd string-like part material 114, and the length spring 132 is covered between the lower part of drawing 6 of the above-mentioned migration support plates 82 and 86, and the block attached member 134 which moves to one of the above-mentioned block 118, and it is arranged so that they may be mutually paid well. It is fixed to the migration support plates 82 and 86 so that the block 100 as migration supporter material which supports the other side of the 1st string-like part material 106 movable may move to the spacing pin 90 as 2nd interlocking member, the block 104 as 1st migration member, and a list in one. And it is supported by the fixed support pin 112 of the immobilization support plate 108 rather than the block 100 as migration supporter material still more nearly impossible [migration of the 1st right-hand side (other side) string-like part material 106]. Therefore, it is easy to be short [the length spring 132], and the miniaturization is attained rather than it prepares the length spring which pulls back the 1st string-like part material 106 which moves 4 times as for a long time as the 2nd string-like part material 114.

[0028] For example, if this cassette contact object 120 is moved only for distance d under drawing 7, by the

block 118, the 2nd string-like part material 114 will be pushed caudad, and will move relatively to this block 118 or the cassette contact object 120. Only distance 2xd moves the spacing pin 90 by which only die-length d was sent by rotation of a block 118, and the 2nd string-like part material 114 was connected with the edge of the 2nd string-like part material 114 of the right in drawing 7 from the right-hand side (movable support side) of the block 118 under drawing 7 to left-hand side (migration improper support side). That is, this block 118 is functioning as a fall block.

[0029] At this time, it is fixed to the spacing pin 90, and similarly, only distance 2xd is united in down [in drawing 7], and the migration support plates 82 and 86 of two sheets and the block 100,102,104 of those move caudad the edge of the 2nd string-like part material 114 of the right in drawing 7 to it. Drawing 7 is caudad pushed for the interstitial segment of the 1st string-like part material 106 by the block 104 with migration in those lower parts. The 1st string-like part material 106 is sent only for die-length 2xd to left-hand side (migration improper support side) by rotation of a block 104 from the right-hand side (movable support side) of the block 104. Only distance 4xd moves the 1st interlocking member 78 and yarn attachment component 50 which were further fixed to the 1st string-like part material 106 on the right of the right block 100 rather than this block 104 under drawing 6 . Thus, this migration device 52 is constituted so that the movement magnitude it is 4 times whose movement magnitude of the cassette contact object 120 of this may be produced.

[0030] Next, the threader hook device 55 which moves the threader hook 35 of this sewing machine 10 is explained. As shown in drawing 9 , like a sewing machine given in application of these above-mentioned people The threader hook 35 which can advance the eye hole 51 of a needle 36, The energization member 136 which always energizes the threader hook 35 up, and the attitude device 138 which advances the threader hook 35 into the eye hole 51 of a needle 36, and retreats, Energization member 136 The transfer location which transmits the downward force which resists the energization force to depend and moves the threader hook 35 below, It has the cassette contact object 139 prepared in the cassette insertion section 46 for descending the threader rod 47 to the movable transfer member 48 and wearing of the yarn cassette 44 with between the cutoff locations which intercepted transfer of the downward force. In addition, a part of the bottom is dented toward the upper part, and hook 35 catches yarn in the indented part.

[0031] It is a hauling spring for always energizing the threader rod 47 upwards in the energization member 136. In the attitude device 138, it is the pin 142 grade horizontally projected from that of the rotation member 140 (refer to drawing 10) attached in the threader rod 47 up, and its threader rod 47. According to this rotation member 140, the threader rod 47 descends with wearing of the yarn cassette 44, and if the expanding pin 144 which projects from that threader rod 47 contacts the height adjustment member 146 fixed to the needle bar 26, the pin 142 of the threader rod 47 will descend along the straight-line slot 148 of the rotation member 140. And if the threader rod 47 descends to a position, a pin 142 arrives at the spiral slot 150 of the rotation member 140, the threader rod 47 and the threader hook 35 rotate, and the threader hook 35 advances into the eye hole 51 of a needle 36, and projects from the opposite side of the eye hole 51 of a needle 36. And if the above-mentioned transfer member 48 will be in the cut off state near a perpendicular condition posture and the threader rod 47 goes up according to the energization force of an energization member, the threader hook 35 will carry out inverse rotation, and the threader hook 35 will retreat from the eye hole 51 of a needle 36.

[0032] It lets the transfer member 48 pass possible [sliding of the guide shaft 151], and the central part of the transfer member 48 is rolled as it is in the transfer location shown in drawing 11 , and it is supported pivotable and it is energized by the energization member 152 which is a spring. When it is in the transfer location, the transfer member 48 leans for a while from the perpendicular posture, is the upper limit 153 of the transfer member 48, can contact above the contact section 154 of the upper part of the rotation member 140, and can transmit the force which descends the threader rod 47. Moreover, the energization force of the energization member 152 is resisted, the transfer member 152 rotates, and if it moves to the cutoff location shown in drawing 12 , the upper limit 153 of the transfer member 48 will estrange from the contact section 154. That is, the threader rod 47 is made into the condition that it can go up according to the energization force of the energization member 136. ABS or polyacetate resin for protection of the contact section 154 of the rotation member 140 of resin is wound around the upper part 153 of this metal transfer member 48.

Although this transfer member 48 is always energized up by the energization member 155 which is a length spring, it resists that energization force and is caudad moved by wearing of the yarn cassette 44.

[0033] Unlike application of these above-mentioned people, by this sewing machine 10, the contact member 158 which moves the transfer member 48 to a cutoff location in contact with the transfer member 48 is formed as follows. If the above-mentioned migration device 52 moves the yarn attachment component 50 to

a predetermined location, the contact member 158 is being fixed to the support block 54 so that the contact member 158 may move the transfer member 48 to a cutoff location in contact with the transfer member 48. That is, this support block 54 is being fixed to the sewing-machine frame 24, and with vertical movement of a needle bar 26 or a needle 36, and horizontal rocking, this contact member 158 is arranged, as it is not concerned but is in a fixed location. In the opposite side of the eye hole 51 of the needle 36 with which the threader hook 35 projects, the position about the yarn attachment component 50 is a location of the upper part [hook / 35 / which was projected from the eye hole 51 of a needle 36 / threader], in order that the threader hook 35 may catch Yarn T. That is, it is the location which it goes up [location] so that Yarn T may intersect the threader hook 35 projected from the eye hole 51 of a needle 36, and Yarn T is positively pressed [location] against the threader hook 35 bottom, and is making Yarn T crooked slightly.

[0034] Unlike application of these above-mentioned people, the slit type balance 32 and the tabular guide member 160 which extends right and left on both sides of that balance 32 are formed, and if the yarn T horizontally stretched by the yarn cassette 44 from the upper part of a balance 32 descends along with the upper limit of this guide member 160, the sewing machine 10 consists of this sewing machine 10 so that that yarn T may be led to a balance 32.

[0035] Moreover, by this sewing machine 10, unlike application of these above-mentioned people, there is yarn T stretched independently for the above-mentioned balance 32, the above-mentioned yarn attachment component 50 catches that another yarn T to the yarn cassette 44 with wearing of the yarn cassette 44, and that yarn T is caudad moved to it toward the eye hole 51 of a needle 36.

[0036] The threader actuation at the time of equipping with the yarn cassette 44 the sewing machine 10 constituted as mentioned above is explained.

[0037] By this sewing machine 10, the yarn to a balance 32 or the threader to the eye hole 51 of ** and a needle 36 is completed only by pushing the yarn cassette 44 caudad until an operator inserts the yarn cassette 44 in a cassette mount 46 from the upper part and the yarn cassette 44 arrives at the bottom of a cassette mount 46. While pushing the cassette contact object 120 on the right-hand side of [a part of] the yarn cassette 44 at this time, a part of central site of the yarn cassette 44 pushes the cassette contact object 139 below. That is, the attitude device 139 of the threader device 38 and the migration device 52 operate in manual operation by the manual operation of pushing the yarn cassette 44 on descent. The threader rod 47 descends by the actuation.

[0038] Moreover, in the front of the yarn cassette 44, Yarn T extends in the direction which intersects perpendicularly with the space of drawing 6, and is stretched in it, and it is caught by the yarn attachment component 50 to which this stretched yarn T descends from the location of drawing 13. The yarn attachment component 50 moves distance about 4 times the distance of the cassette contact object 120 having been pushed on the yarn cassette 44, and having moved at this time. And as shown in drawing 14, the yarn attachment component 50 descends most. At this time, the inside of the predetermined vertical range (the yarn attachment component 162 located in order to carry out a threader to drawing 15 in the eye hole 51 of the needle 36 of an upper limit location and a minimum location is illustrated) in which a threader is possible to a needle 36, Caudad rather than the location where the threader hook 35 projects from the opposite side of the eye hole 51 of the needle 36 which stops in the lowest location After the migration device 52 moves two of the yarn maintenance arms 62 and 64 of the yarn attachment component 50, the threader hook 35 projects from the opposite side of the eye hole 51 of a needle 36 according to the attitude device 138, as shown in drawing 16. in addition -- although the location holding the yarn T of the yarn maintenance arms 62 and 64 is shifted up and down a little as shown in drawing 15 -- any of the yarn maintenance location -- although -- it consists of the opposite side of the eye hole 51 of the needle 36 which stops in the lowest location of the threader possible range caudad rather than the location where the threader hook 35 projects.

[0039] The migration device 52 moves the yarn attachment component 50 upwards so that two yarn maintenance arms 62 and 64 may be moved more nearly up than the threader hook 35 projected from the eye hole 51 of the needle 36. That is, since the yarn attachment component 50 goes up after [the threader hook 35 projected from the eye hole 51 of the needle 36 when located in the vertical range in which the threader which the eye hole 51 of a needle 36 shows to drawing 15 is possible] the yarn attachment component 50 moves caudad, it differs [having only only stretched Yarn T like before, and], and Yarn T is made to intersect the threader hook 35 positively. In addition, since a migration device 52 is not concerned with the vertical halt location or the horizontal rocking location of a needle bar 26 on the occasion of a threader but it has only the fixed moving trucking of dropping the yarn attachment component 50 caudad, rather than the location where the threader hook 35 projects from the opposite side of the eye hole 51 of the

needle 36 which stops to a needle 36 in the lowest location among the predetermined vertical range in which a threader is possible, the migration device 52 ends with an easy configuration.

[0040] At the time of this rise, between two yarn maintenance arms 62 and 64, after the threader hook 35 has inserted, it moves from the location which is shown in drawing 14 and which descended most. If the two yarn maintenance arms 62 and 64 reach more nearly up than the threader hook 35 and the yarn attachment component 50 is moved to the location of flume *****, the transfer member 48 will contact the contact member 158, it will move to a cutoff location from a transfer location, and the threader rod 47 will go up up according to the elastic force of an elastic body.

[0041] In this rise process, as shown in drawing 17, it is supported by the threader hook attachment component 162, and the point of the left yarn maintenance arm 62 runs against the lower part of the threader hook attachment component 162, therefore the climbing speed of the yarn attachment component 50 by the migration device 52 is controlled, and, on the other hand, the yarn attachment component 50 does not move the threader hook 35 to a target upwards rather than the eye hole 51 of a needle 36. That is, to the pulling-back-2nd string-like part material 114 length spring 132, a load called the contact to the yarn attachment component 50 and the threader hook attachment component 162 was added, and the rate of a rise of the yarn attachment component 50 was controlled (reduction). The threader rod 47 anti-rotates, and the contact to this yarn attachment component 50 and the threader hook yarn attachment component 162 is continued until a threader 35 estranges completely from the eye hole 51 of a needle 36. As shown in drawing 18, the threader hook 35 retreats from the eye hole 51 of a needle 36, it cancels, and with the above-mentioned length spring 132, the 2nd string-like part material 114 is pulled back, and the contact to the yarn attachment component 50 and the threader hook attachment component 162 goes up [the yarn attachment component 50 gathers a rate and].

[0042] In addition, it will evacuate from the moving trucking of the yarn cassette 44, the above-mentioned length spring 132 will come to be effective, the 2nd string-like part material 114 will be pulled back, and the cassette contact object 120 will return to the original condition as shown in drawing 7, if it is pushed on the yarn cassette 44 and specified quantity migration is carried out. That is, the yarn attachment component 50 goes up.

[0043] In the gestalt of operation mentioned above, in the sewing machine 10 using the yarn cassette 44, although the invention in this application was carried out, the invention in this application may be carried out to the sewing machine 10 which does not use the yarn cassette 44. In that case, a threader control lever is prepared and it performs manual operation of a threader, and it constitutes so that the threader device 38 may operate by the manual operation. In the gestalt of operation mentioned above, although the invention in this application was carried out to the sewing machine 10 which faces horizontally to the sewing-machine frame 24, and rocks a needle 36, a needle 36 may be used for the sewing machine 10 which is not rocked horizontally.

[0044] Although Yarn T is horizontally stretched in the gestalt to the operation mentioned above, Yarn T may be stretched in the vertical direction, and it moves to it horizontally in that case, and is made for the threader hook 35 and Yarn T to cross. If ***** intersects the operation mentioned above in two yarn maintenance arms 62 and 64 and intersects the threader hook 35 in Yarn T with a gestalt in the migration case, what is necessary is just one [at least] yarn attachment component 50.

[0045] Although the yarn attachment component 50 was moved to the operation mentioned above in the gestalt using the fall block, the threader hook 35 may be moved. Moreover, although the thin wire was used with the gestalt of operation mentioned above, a belt without a gear tooth, a timing belt, a gear, etc. may be used. Although the fall block is used for the operation mentioned above with the gestalt, as long as string-like part material is movable similarly, you may be things, such as a mere cylinder.

[0046] Although the invention in this application was carried out with the gestalt of operation mentioned above to the sewing machine 10 which rocks a needle 36 to a longitudinal direction, you may carry out by the sewing machine 10 which rocks a needle 36 to a cross direction.

[0047] Although the migration device 52 is constituted so that the yarn attachment component 50 may descend in parallel with a needle 36 and may go up in parallel with a needle 36 again in the gestalt of operation mentioned above in the close predetermined range of the needle 36 after the yarn attachment component 50 approaches a needle 36 To a needle 36, it is not parallel and the migration device 52 may move the yarn attachment component 50 aslant to a needle 36. In the gestalt of operation mentioned above, although the migration device 52 is moving the yarn attachment component 50 in parallel to a needle 36 at the time of the migration at both times of descent of the yarn attachment component 50, and a rise, the migration device 52 may move the yarn attachment component 50 in parallel to a needle 36 only at the time

of one at the time of descent or a rise of migration.

[0048]

[Effect of the Invention] In case a hook goes up, by the sewing machine according to claim 1, the attachment component has reached the position, and a hook and an attachment component serve as predetermined relation, and it can let yarn pass to the eye hole of a needle certainly, so that clearly from having explained above.

[0049] By the sewing machine according to claim 2, a contact member is supported by the sewing-machine frame, is arranged independently with the vertical location of a needle, and can let yarn pass to the eye hole of a needle certainly with an easy configuration rather than the configuration which always follows the vertical location at the time of a halt of a needle, and makes distance of a contact member and a transfer member regularity.

[0050] By the sewing machine according to claim 3, the migration device is arranged independently with the horizontal position of the rocked needle, and can let yarn pass to the eye hole of a needle certainly with an easy configuration rather than the configuration to which the horizontal position at the time of rocking of a needle is always followed, and distance of a contact member and a transfer member is made regularity.

[Translation done.]

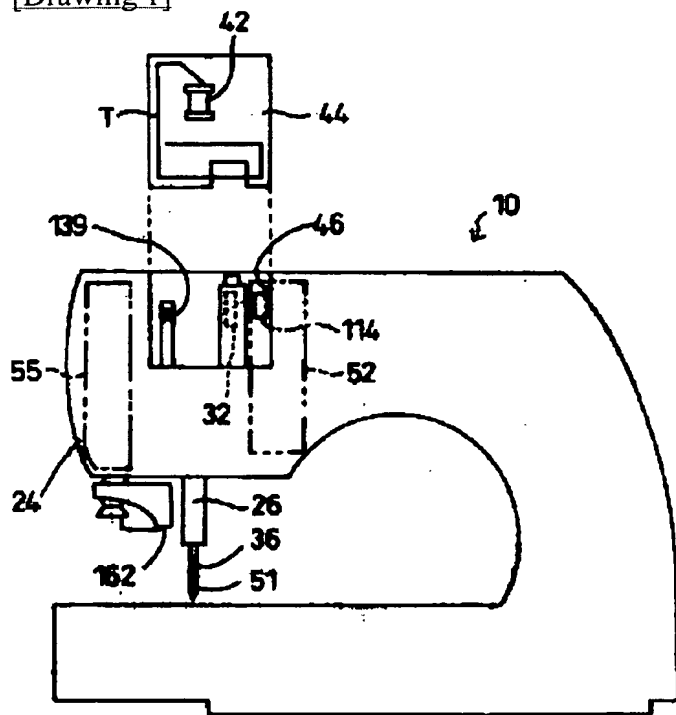
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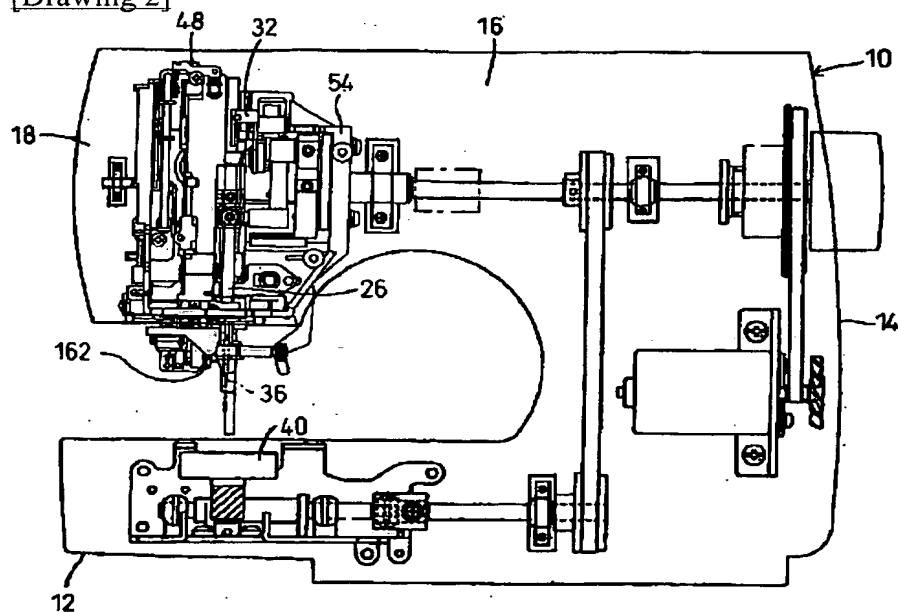
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DRAWINGS

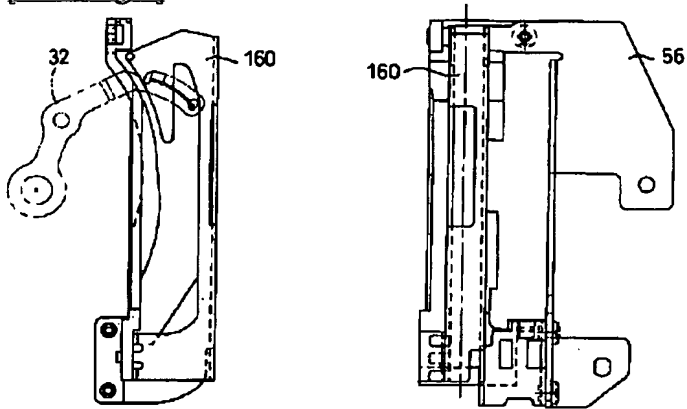
[Drawing 1]



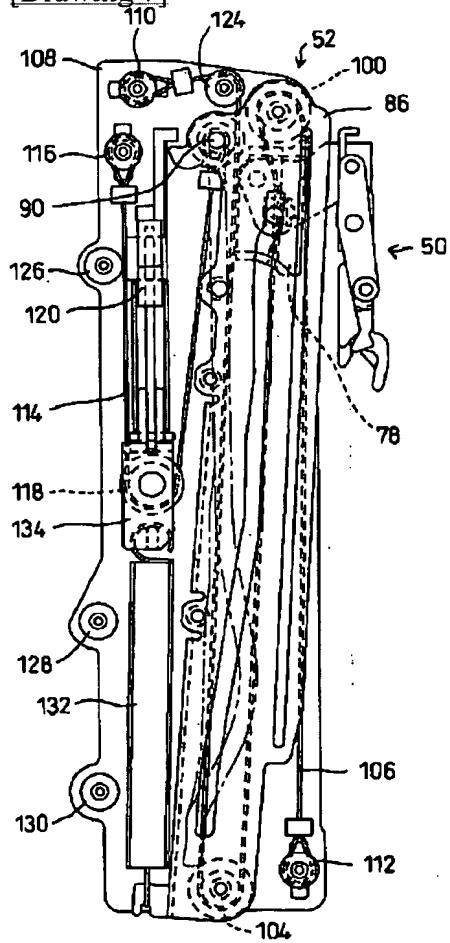
[Drawing 2]



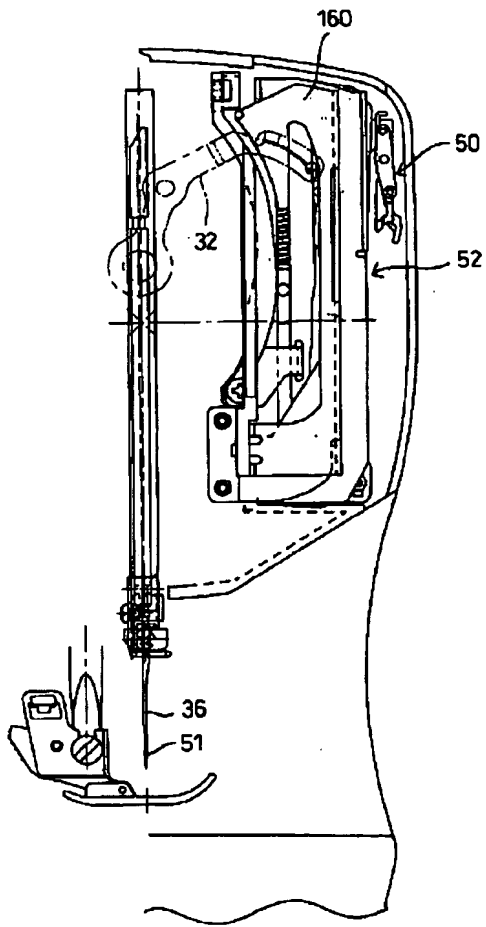
[Drawing 5]



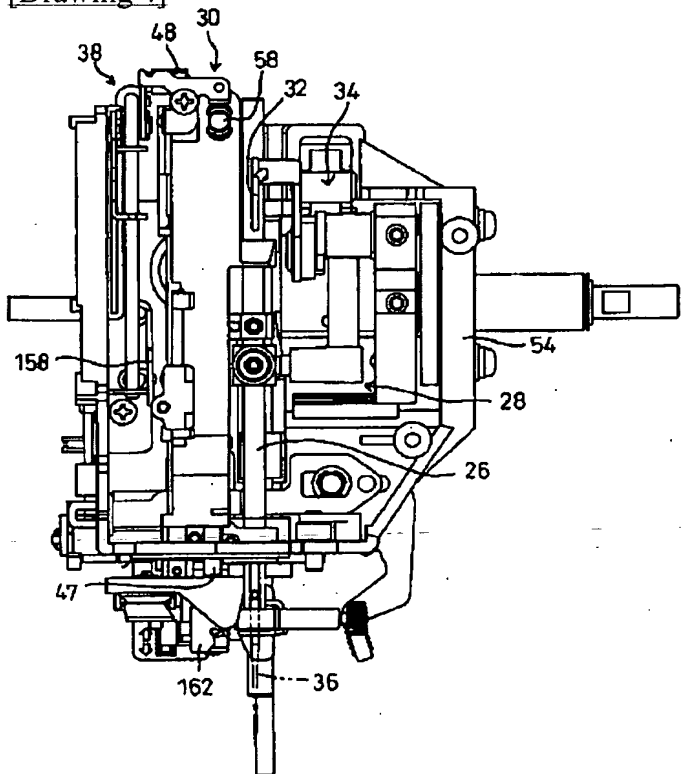
[Drawing 7]



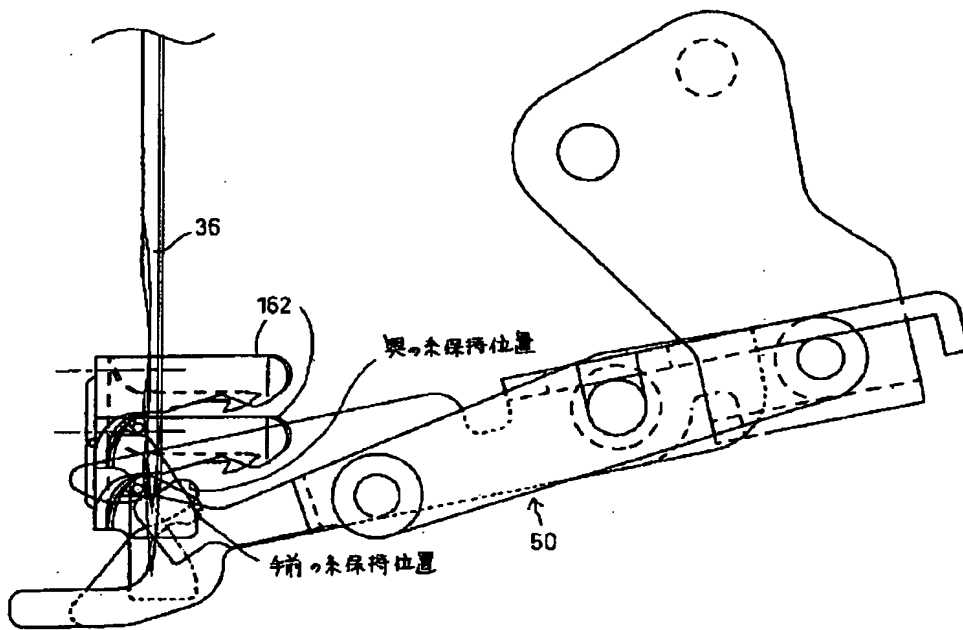
[Drawing 3]



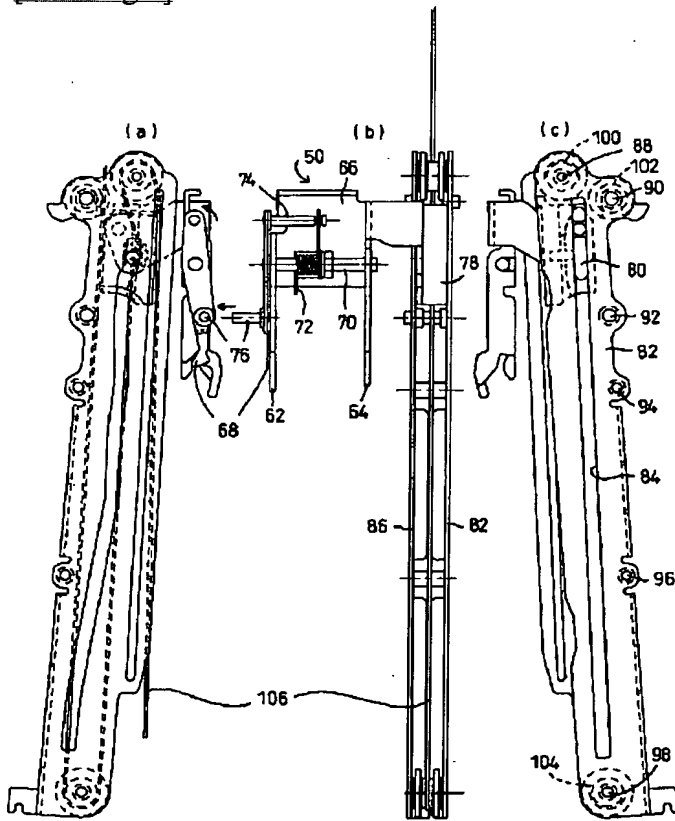
[Drawing 4]



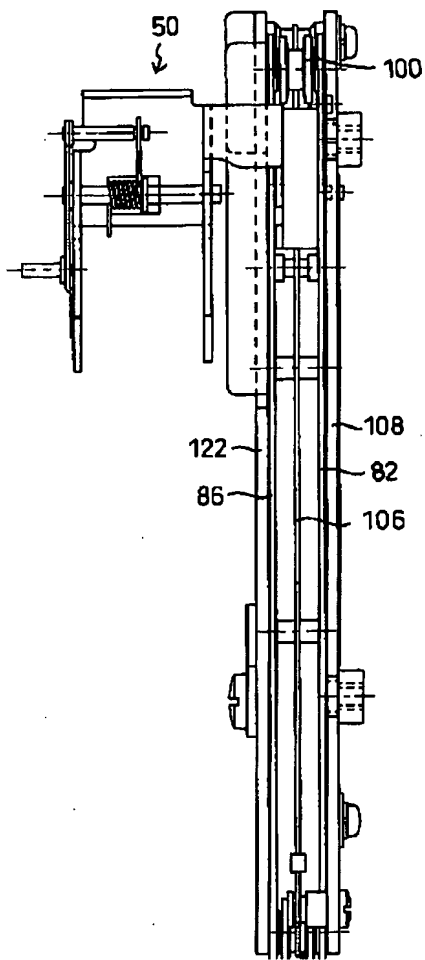
[Drawing 15]



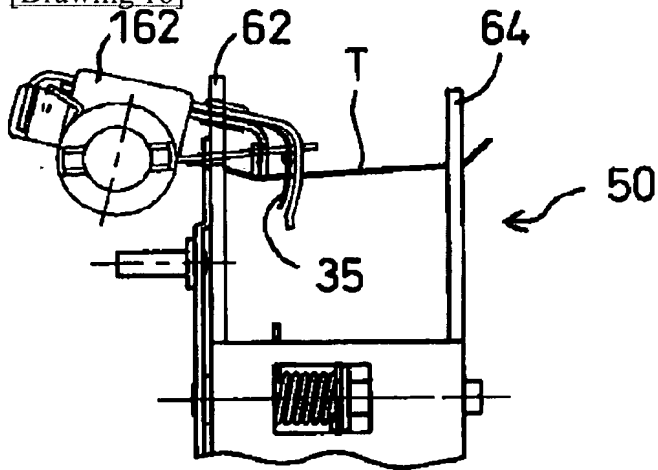
[Drawing 6]



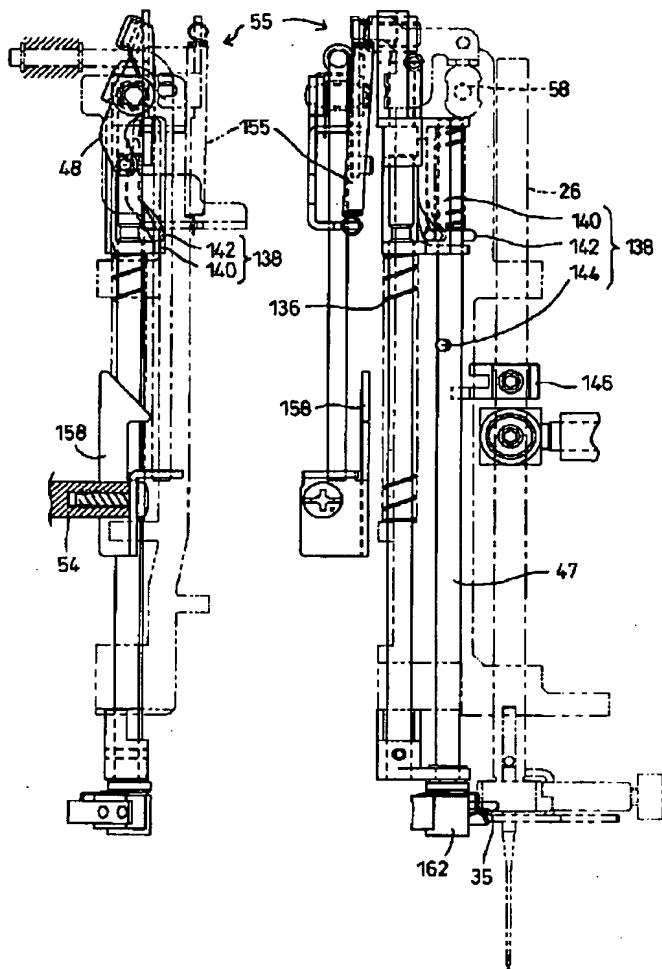
[Drawing 8]



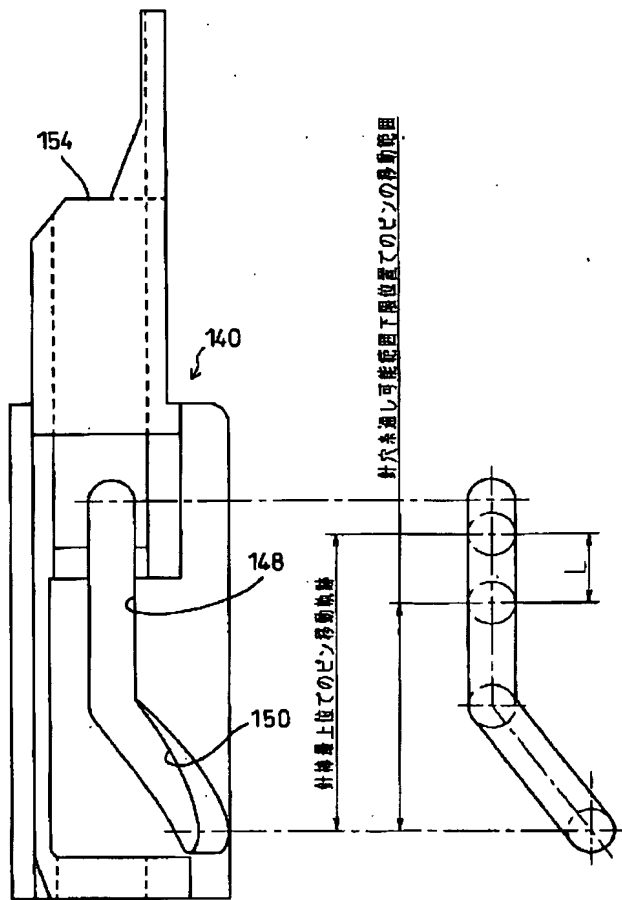
[Drawing 16]



[Drawing 9]

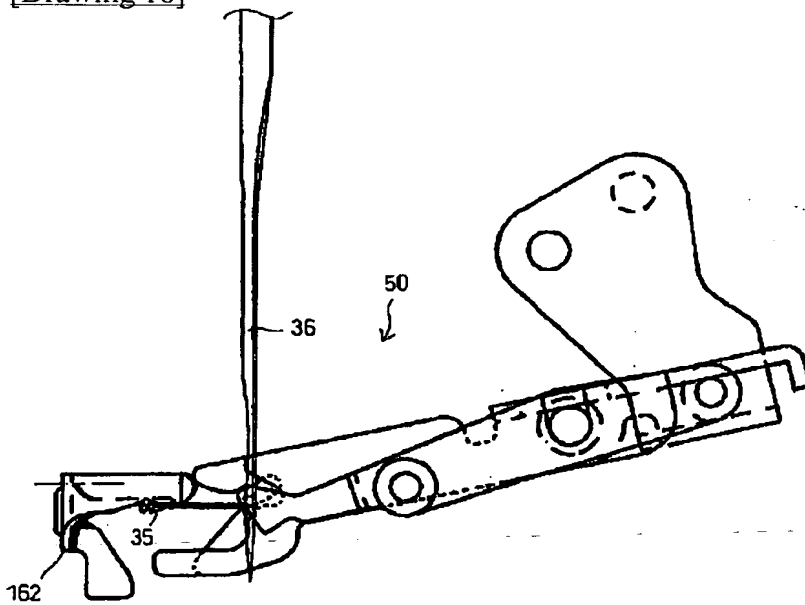


[Drawing 10]

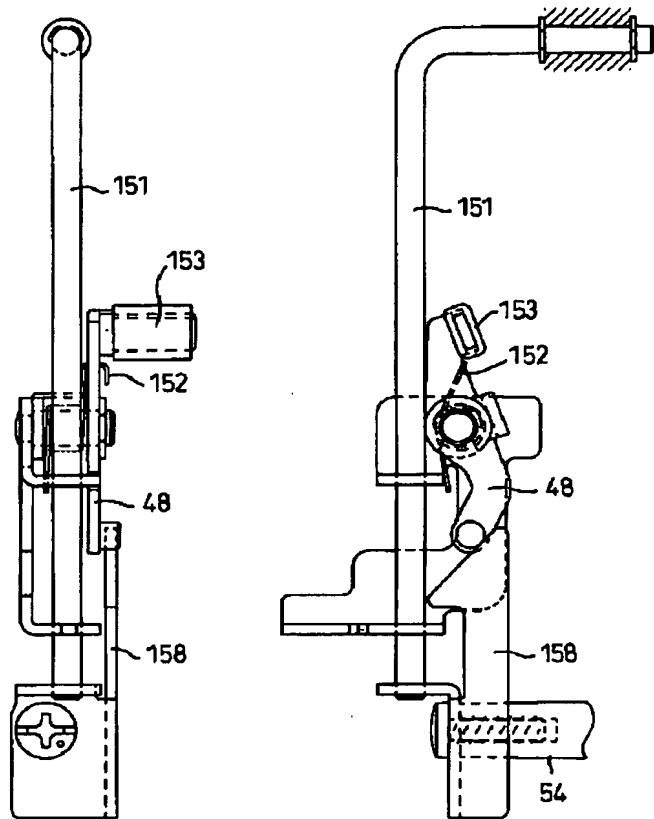


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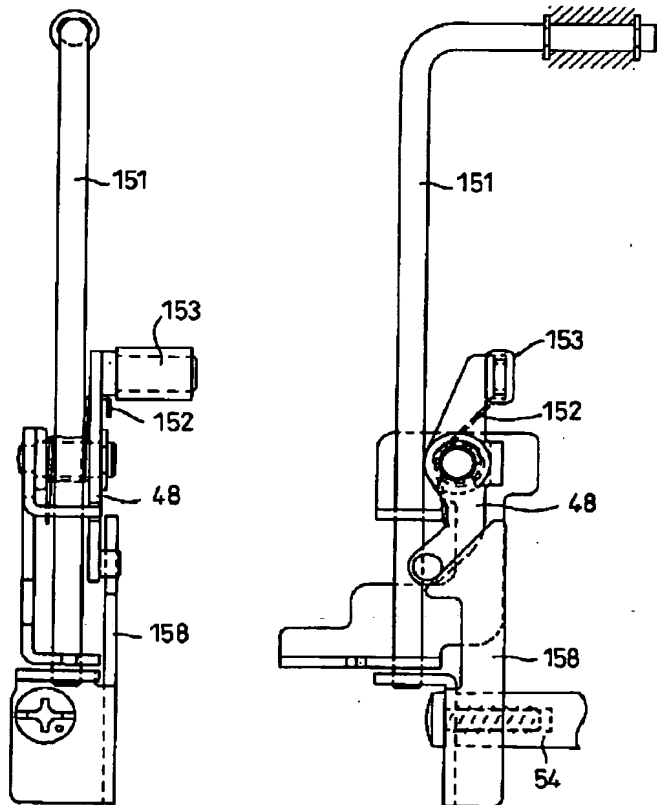
[Drawing 18]



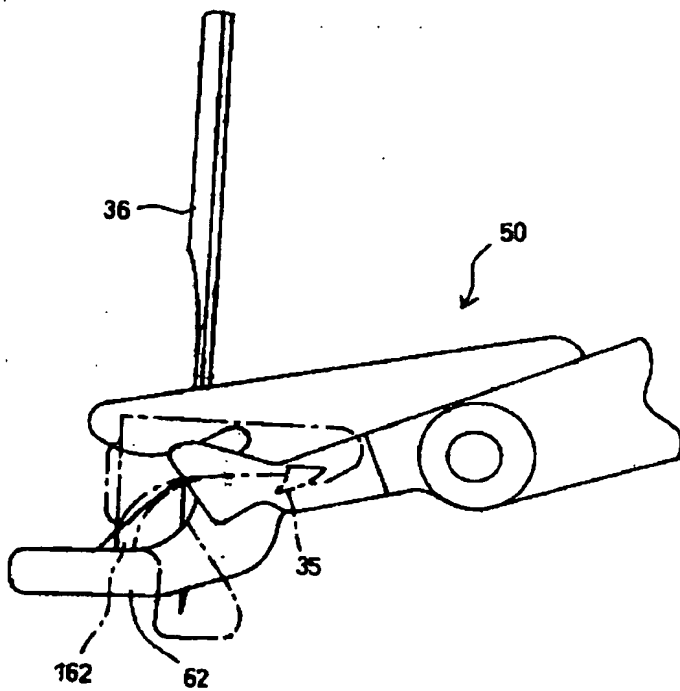
[Drawing 11]



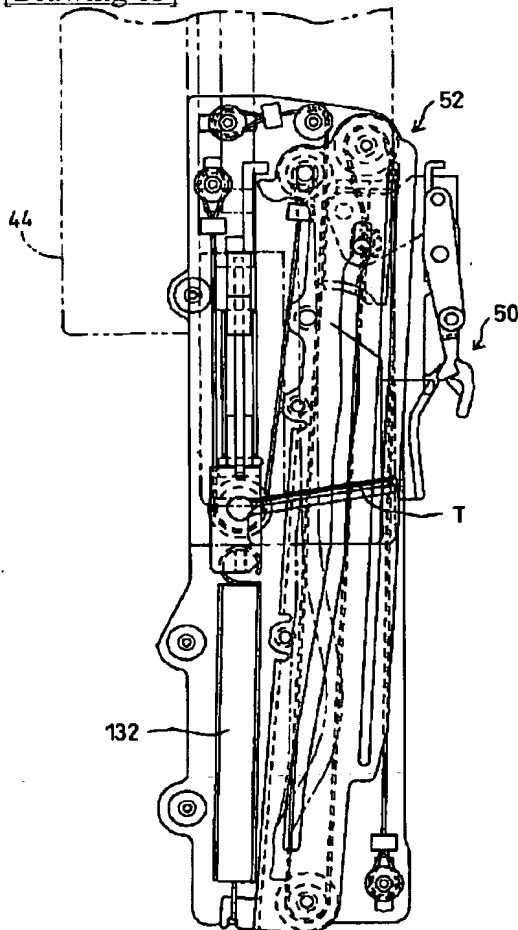
[Drawing 12]



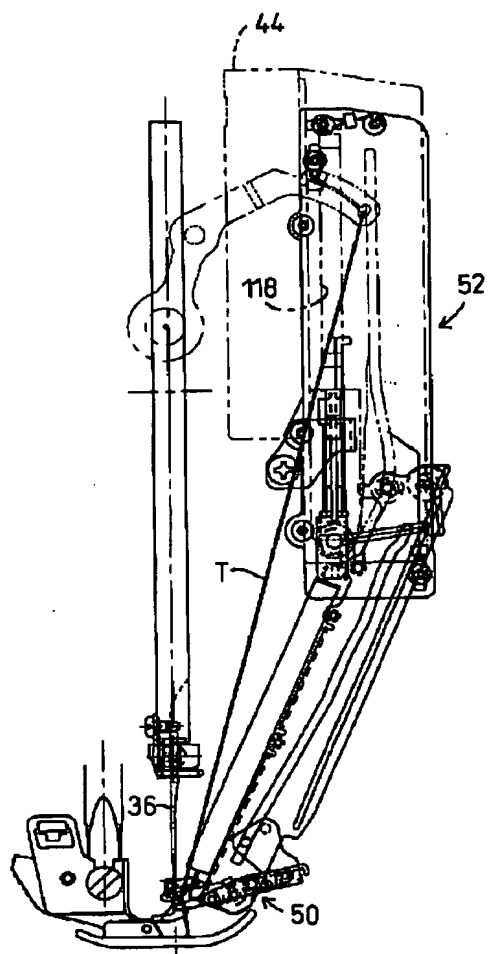
[Drawing 17]



[Drawing 13]



[Drawing 14]



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